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This grant provided partial support for the Fourth Conference on the Neurobiology of Learning and Memory which was held at Irvine, California on October 17-20, 1990. The conference was organized and sponsored by the Center for the Neurobiology of Learning and Memory of the University of California, Irvine. The aim of the conference was to review current fact and theory concerning three research issues in the neurobiology of learning and memory: 1) the features and loci of patterns of brain activity induced by learning, 2) the roles of different brain systems in mediating learning and memory, and 3) cellular modifications underlying learning and memory. The presentations and discussions represented all levels of analysis from molecular neurobiology through systems/behavioral studies. There were 20 principal speakers, 98 poster presentations and over 300 registered participants representing 20 countries. A book based on the proceedings of the conference, *Memory: Organization and Locus of Change* (Larry R. Squire, Norman M. Weinberger, Gary Lynch and James L. McGaugh, Editors) is in press.

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Technical Report

This grant provided partial support for the Fourth Conference on the Neurobiology of Learning and Memory which was held at Irvine, California on October 17-20, 1990. The conference was organized and sponsored by the Center for the Neurobiology of Learning and Memory of the University of California, Irvine. There were 20 principal speakers, 98 poster presentations and over 300 registered participants representing 20 countries. A book based on the proceedings of the conference, *Memory: Organization and Locus of Change* (Larry R. Squire, Norman M. Weinberger, Gary Lynch and James L. McGaugh, Editors) is in press.

The aim of the conference was to review current fact and theory concerning three research issues in the neurobiology of learning and memory: 1) the features and loci of patterns of brain activity induced by learning, 2) the roles of different brain systems in mediating learning and memory, and 3) cellular modifications underlying learning and memory. The presentations and discussions represented all levels of analysis from molecular neurobiology through systems/behavioral studies. The conference opened with a keynote address reviewing current concepts of human memory.

The sessions on the first day summarized the findings and interpretations of experiments using neurophysiological and imaging techniques, including optical imaging and PET techniques to determine the brain regions activated by different forms of stimulation and training. It is clear from the presentations and discussion that new imaging techniques provide powerful tools for use in investigating brain activity induced by learning and are, thus, likely to yield new insights into brain processes underlying memory.

The second session focused more explicitly on the involvement of specific brain systems in different forms of behaviorally induced neuroplasticity. This session provided significant clarification of the roles of several structures, including the amygdala, hippocampus, and basal forebrain region, as well as the cortex, in learning and memory.

The presentations in the third session reviewed recent findings concerning the cellular consequences, including structural and molecular changes, induced by stimulation and training. Significant advancement has been achieved in understanding the nature and bases of LTP (long term potentiation). And, such understanding has produced increased support for the view that the mechanisms underlying LTP serve as a basis for some forms of memory. The findings discussed in the third session also provided clear evidence that continued progress in understanding cellular mechanisms of learning and memory will require increased research into the roles of genes expressed by training-induced activation of the brain.

In sum, the conference provided participants with an up-to-date view of current research and theory concerning neurobiological processes mediating learning and memory and provided direction for potentially fruitful avenues of research.